

Development of an In vitro Gut-BBB Interaction Model for Studying Neurocognitive Diseases

김민혁, 송지원, 김지우, 김대현, 성종환[†]

홍익대학교

(jhsung22@hongik.ac.kr[†])

Lately, considerable evidences have indicated that neurocognitive diseases and disorders are closely related to disruptions in the intestinal environment. For this so-called “Gut-Brain Axis (GBA)”, Blood-Brain Barrier (BBB) acts as an essential element since substantial biochemical interactions between gut and brain exist. Research on correlation of GBA and neurocognitive issues has mainly focused on either animal models or samples from human donors, which often feature low throughput of data, ethical and economic problems. Despite recent burgeoning organ-on-a-chip technologies, there exists no such platform to solve these problems of GBA research. Herein, we suggest a co-culture platform inspired by our pervious gut-liver chip models to mimic gut-BBB interaction. Our results showed this platform could not only mimic transport of biomolecules across the barriers, but also disruption of gut barrier and BBB which are frequently accompanied with neurocognitive diseases and disorders. In future work, these barriers will be co-cultured with immune cells, brain cells, and microorganisms to more closely mimic in vivo environment.